

## ABSTRACT

1        A method wherein a thermal gradient over a substrate enhances Chemical Vapor  
2 Deposition (CVD) at low pressures. An upper heat source is positioned above the substrate and  
3 a lower heat source is positioned below the substrate. The upper and lower heat sources are  
4 operated to raise the substrate temperature to 400-700° and cause a heat gradient of 100-200° C  
5 between the upper and lower heat sources. This heat gradient causes an increase in the  
6 deposition rate for a given reactant gas flow rate and chamber pressure. The preferred  
7 parameters for implementation of the present invention for poly crystalline silicon deposition  
8 include the temperature of the upper heat source 100-200° C above the lower heat source, a  
9 substrate temperature in the range of 400-700° C, a reactant gas pressure between 250 and 1000  
10 mTorr, and a gas flow rate of 200-800 sccm. The substrate is rotated, with 5 RPM being a  
11 typical rate. A deposition rate of 2000 angstroms per minute deposition of poly crystalline  
12 silicon is achieved with a 200° C temperature differential, substrate temperature of 650° C,  
13 pressure of 250 mTorr and silane flow of 500 sccm.

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